

We Claim:

1. A method of generating a prediction of values in a reservoir, comprising the steps of:
  - 5 (a) receiving input data characterizing the reservoir;
  - (b) producing a computer model in response to said input data representing said reservoir, the producing step (b) of producing said computer model including the steps of,
    - 10 (b1) calculating said values in one dimension associated with a single layer in said reservoir, each of said values existing at a single point in space in said reservoir and at a single point in time in said reservoir,
    - (b2) calculating said values in said one dimension associated with multiple layers in said reservoir, each of said values in each of said multiple layers existing at a single point in space in said reservoir and at a single point in time in said reservoir,
    - 15 (b3) calculating said values in three dimensions associated with said multiple layers in said reservoir, each of said values in each of said multiple layers in said three dimensions existing at a single point in space in said reservoir and at a single point in time in said reservoir,
    - 20 (b4) calculating said values in said three dimensions as a function of time, said values being associated with said multiple layers in said reservoir, each of said values in each of said multiple layers in said three dimensions existing at a single point in space in said reservoir, said each of said values in said each of said multiple layers in said three dimensions existing at any future point in time in said reservoir, said computer model being produced in response to the calculating step (b4);
- 30 verifying the computer model; and

using said computer model, generating said prediction of said values in said reservoir in response to the verifying step.

2. The method of claim 1, wherein the calculating step (b2) comprises the steps of:

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calculating said values in said one dimension associated with multiple layers in said reservoir, each of said values in each of said multiple layers existing at a single point in space in said reservoir and at a single point in time in said reservoir; and

10 calculating said values in two dimensions associated with said multiple layers in said reservoir, each of said values in each of said multiple layers in said two dimensions existing at a single point in space in said reservoir and at a single point in time in said reservoir.

15 3. A program storage device readable by a machine tangibly embodying a set of instructions executable by the machine to perform method steps for generating a prediction of values in a reservoir, said method steps comprising:

(a) receiving input data characterizing the reservoir;

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(b) producing a computer model in response to said input data representing said reservoir, the producing step (b) of producing said computer model including the steps of,

25 (b1) calculating said values in one dimension associated with a single layer in said reservoir, each of said values existing at a single point in space in said reservoir and at a single point in time in said reservoir,

30 (b2) calculating said values in said one dimension associated with multiple layers in said reservoir, each of said values in each of said multiple layers existing at a single point in space in said reservoir and at a single point in time in said reservoir,

(b3) calculating said values in three dimensions associated with said multiple layers in said reservoir, each of said values in each of said multiple layers in said three dimensions existing at a single point in space in said reservoir and at a single point in time in said reservoir,

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(b4) calculating said values in said three dimensions as a function of time, said values being associated with said multiple layers in said reservoir, each of said values in each of said multiple layers in said three dimensions existing at a single point in space in said reservoir, said each of said values in said each of said multiple layers in said three dimensions existing at any future point in time in said reservoir, said computer model being produced in response to the calculating step (b4);

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verifying the computer model; and

15 using said computer model, generating said prediction of said values in said reservoir in response to the verifying step.

4. The program storage device of claim 3, wherein the calculating step (b2) comprises the steps of:

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calculating said values in said one dimension associated with multiple layers in said reservoir, each of said values in each of said multiple layers existing at a single point in space in said reservoir and at a single point in time in said reservoir; and

25 calculating said values in two dimensions associated with said multiple layers in said reservoir, each of said values in each of said multiple layers in said two dimensions existing at a single point in space in said reservoir and at a single point in time in said reservoir.

5. A system adapted for generating a prediction of values in a reservoir, comprising:

first apparatus adapted for receiving input data characterizing the reservoir;

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second apparatus adapted for producing a computer model in response to said input data representing said reservoir, said second apparatus adapted for producing said computer model including,

10 third apparatus adapted for calculating said values in one dimension associated with a single layer in said reservoir, each of said values existing at a single point in space in said reservoir and at a single point in time in said reservoir,

15 fourth apparatus adapted for calculating said values in said one dimension associated with multiple layers in said reservoir, each of said values in each of said multiple layers existing at a single point in space in said reservoir and at a single point in time in said reservoir,

20 fifth apparatus adapted for calculating said values in three dimensions associated with said multiple layers in said reservoir, each of said values in each of said multiple layers in said three dimensions existing at a single point in space in said reservoir and at a single point in time in said reservoir,

25 sixth apparatus adapted for calculating said values in said three dimensions as a function of time, said values being associated with said multiple layers in said reservoir, each of said values in each of said multiple layers in said three dimensions existing at a single point in space in said reservoir, said each of said values in said each of said multiple layers in said three dimensions existing at any future point in time in said reservoir, said computer model being produced in response to the calculating performed by said sixth apparatus;

seventh apparatus adapted for verifying the computer model thereby generating a verified computer model; and

eighth apparatus, responsive to the verified computer model, adapted for generating said

5 prediction of said values in said reservoir in response to the verifying performed by the seventh apparatus.

6. The system of claim 5, wherein the fourth apparatus comprises:

10 apparatus adapted for calculating said values in said one dimension associated with multiple layers in said reservoir, each of said values in each of said multiple layers existing at a single point in space in said reservoir and at a single point in time in said reservoir; and

15 apparatus adapted for calculating said values in two dimensions associated with said multiple layers in said reservoir, each of said values in each of said multiple layers in said two dimensions existing at a single point in space in said reservoir and at a single point in time in said reservoir.

20 7. A method of producing a computer model in response to input data representing a reservoir, comprising the steps of:

25 (a) calculating values in one dimension associated with a single layer in said reservoir, each of said values existing at a single point in space in said reservoir and at a single point in time in said reservoir,

(b) calculating said values in said one dimension associated with multiple layers in said reservoir, each of said values in each of said multiple layers existing at a single point in space in said reservoir and at a single point in time in said reservoir,

(c) calculating said values in three dimensions associated with said multiple layers in said reservoir, each of said values in each of said multiple layers in said three dimensions existing at a single point in space in said reservoir and at a single point in time in said reservoir, and

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(d) calculating said values in said three dimensions as a function of time, said values being associated with said multiple layers in said reservoir, each of said values in each of said multiple layers in said three dimensions existing at a single point in space in said reservoir, said each of said values in said each of said multiple layers in said three dimensions existing at any future point in time in said reservoir, said computer model being produced in response to the calculating step (d).

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8. The method of claim 7, wherein the calculating step (b) comprises the steps of:

15 calculating said values in said one dimension associated with multiple layers in said reservoir, each of said values in each of said multiple layers existing at a single point in space in said reservoir and at a single point in time in said reservoir; and

20 calculating said values in two dimensions associated with said multiple layers in said reservoir, each of said values in each of said multiple layers in said two dimensions existing at a single point in space in said reservoir and at a single point in time in said reservoir.

9. A program storage device readable by a machine tangibly embodying a program of  
25 instructions executable by the machine to perform method steps for producing a computer model in response to input data representing a reservoir, said method steps comprising:

30 (a) calculating values in one dimension associated with a single layer in said reservoir, each of said values existing at a single point in space in said reservoir and at a single point in time in said reservoir,

(b) calculating said values in said one dimension associated with multiple layers in said reservoir, each of said values in each of said multiple layers existing at a single point in space in said reservoir and at a single point in time in said reservoir,

5       (c) calculating said values in three dimensions associated with said multiple layers in said reservoir, each of said values in each of said multiple layers in said three dimensions existing at a single point in space in said reservoir and at a single point in time in said reservoir, and

10      (d) calculating said values in said three dimensions as a function of time, said values being associated with said multiple layers in said reservoir, each of said values in each of said multiple layers in said three dimensions existing at a single point in space in said reservoir, said each of said values in said each of said multiple layers in said three dimensions existing at any future point in time in said reservoir, said computer model being produced in response to the calculating step (d).

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10. The program storage device of claim 9, wherein the calculating step (b) comprises the steps of:

20      calculating said values in said one dimension associated with multiple layers in said reservoir, each of said values in each of said multiple layers existing at a single point in space in said reservoir and at a single point in time in said reservoir; and

25      calculating said values in two dimensions associated with said multiple layers in said reservoir, each of said values in each of said multiple layers in said two dimensions existing at a single point in space in said reservoir and at a single point in time in said reservoir.

11. A system adapted for producing a computer model in response to input data representing a reservoir, comprising:

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first apparatus adapted for calculating values in one dimension associated with a single layer in said reservoir, each of said values existing at a single point in space in said reservoir and at a single point in time in said reservoir,

5 second apparatus adapted for calculating said values in said one dimension associated with multiple layers in said reservoir; each of said values in each of said multiple layers existing at a single point in space in said reservoir and at a single point in time in said reservoir,

10 third apparatus adapted for calculating said values in three dimensions associated with said multiple layers in said reservoir, each of said values in each of said multiple layers in said three dimensions existing at a single point in space in said reservoir and at a single point in time in said reservoir, and

15 fourth apparatus adapted for calculating said values in said three dimensions as a function of time, said values being associated with said multiple layers in said reservoir, each of said values in each of said multiple layers in said three dimensions existing at a single point in space in said reservoir, said each of said values in said each of said multiple layers in said three dimensions existing at any future point in time in said reservoir, said

20 computer model being produced when said fourth apparatus calculates said values in said three dimensions as a function of time.

12. The system of claim 11, further comprising:

25 fifth apparatus responsive to the calculation by said second apparatus of said values in said one dimension associated with multiple layers in said reservoir adapted for calculating said values in two dimensions associated with said multiple layers in said reservoir, each of said values in each of said multiple layers in said two dimensions existing at a single point in space in said reservoir and at a single point in time in said

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